UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

December 11, 1998

Baldwin Park Operable Unit Steering Committee
c/o Donald E. Vanderkar
Aerojet General Corporation
Box 13222
Sacramento, CA 95813

Subject: EPA Review of the *August 21, 1998 Phase 1 Treatability Study Report, Perchlorate in Groundwater,* and *October 29, 1998 Phase 2 Treatability Study Work Plan (Baldwin Park Operable Unit, San Gabriel Basin)*

Dear Mr. Vanderkar:

We have completed our review of the August 21, 1998 *Phase 1 Treatability Study Report* and the October 29, 1998 *Phase 2 Treatability Workplan*, prepared by Harding Lawson Associates for the Baldwin Park Operable Unit Steering Committee. The August draft of the Phase 1 Report is a revised version of the initial May 20, 1998 draft; the October draft of the Phase 2 Workplan is a substantially revised version of the initial May 20, 1998 draft.

I understand that DHS representatives also intend to submit comments on the reports.

Our comments on the Phase 2 Workplan are enclosed. At your discretion, the comments can be addressed in a revised workplan or in separate submittals such as the Operation and Maintenance Manual or Sampling and Analysis Plan. We do not plan to submit additional comments on the Phase 1 Report.

Sincerely,

Wayne Praskins
EPA Project Manager

Enclosure

cc: Rick Sakaji, DHS
Nabil Saba, DHS
Gary Yamamoto, DHS
Michael Berlien, La Puente Valley County Water District
John Catts, Harding Lawson Associates

EPA Comments on October 29, 1998
Phase 2 Treatability Study Work Plan, Perchlorate in Groundwater, Baldwin Park Operable Unit, San Gabriel Basin

Location in Workplan	Comment
p4-1, § 4.1	*The Phase 1 Report* (§5.4.6) provides estimates of the recovery time following "planned" and"unplanned" bioreactor shutdowns. The Phase 2 objectives should be expanded to include additional characterization of the treatment process' response to plausible operational problems and perturbations to verify the Phase 1 findings. Also, please provide additional information on design features, backup systems, and operational strategies that will be used to minimize the likelihood of unplanned shutdowns and minimize the recovery time following a shutdown.
p4-1, § 4.1	*The Phase 1 Report* describes the apparent production of vinyl chloride after the bioreactor was shut down. Please describe steps to be taken to minimize the likelihood that conditions promoting vinyl chloride formation will occur, and address the planned treatment train's capability to remove any vinyl chloride produced.
p4-2, § 4.2	This section provides a list of "key operating parameters" for each of the five "unit operations." Please clarify the intended use of this list. Some of the listed items appear to describe inputs to the treatment process that are easily manipulated during operation while others items are indicators of system response (e.g., DO profile, pressure drop). Which parameters will be varied during testing?
p4-4, § 4.3	Section 3 includes a brief mention of aldehydes, ketones, and carboxylic acids as intermediates and potential byproducts of the metabolic breakdown of ethanol. To guide sampling and analysis activities during the Phase 2 study, please discuss in greater detail the chemistry and biochemistry relevant to the degradation of alcohol and cell metabolism and growth. As part of the discussion, please comment on the potential for microorganisms present in the bioreactor to release toxic substances into the water. Is there a potential for trace metals present in bacterial enzymes to be released at toxic levels? Is there a potential for changing redox conditions to result in the formation of organic-metal complexes? Is it known whether the microorganisms make use of molybdenum, as do nitrate-reducing bacteria (and the perchlorate-reducing bacterium identified by the Air Force Research Lab), or other potentially more toxic metals?

p4-4, § 4.3	Section 4.3 mentions that data will be collected to evaluate the formation of disinfection byproducts (DBPs). To guide sampling and analysis activities, please discuss the chemistry of DBP formation in greater detail. Also, in the event that the planned organic substrate (denatured alcohol) and disinfectant (sodium hypochlorite) produce unacceptable levels of DBPs, what alternative organic substrates or disinfectants are likely to produce lower levels? Will there be any impact on the design or operation of the treatment system from any of the new or revised MCLs and MCLGs proposed as part of the Disinfectants/ Disinfection Byproducts Rule (e.g., for chlorite, trihalomethanes, chloroform, haloacetic acids).
p4-4, §4.3	The text states that "the biological inoculum will be characterized using plate counts to identify the microorganisms present..." For the benefit of a non-microbiologist, please describe in greater detail the method of characterization, and what can be learned from identifying the microorganisms (e.g., Would identifying the microbes allow for the identification of microbial nutrient and trace metal requirements?). Will the microorganisms in the bioreactor also be characterized periodically after startup? Also, please describe the origin of the microorganisms in greater detail. If they originate at a baby food processing plant, where in the processing operation are they collected? Please describe the type of environment to which the microbes would have been exposed and acclimated and any data available indicating the potential for pathogens in the inoculum.
§ 4	The September 29, 1998 response to comments letter from HLA to DHS states that tracer studies are planned to evaluate the hydraulic characteristics of the reactor module (p2 of 9/29/98 letter, response to comment #2). Please describe the planned studies.
Figure 5.1	The report appear to specify gravity-fed GAC adsorbers. Has the use of pressure-type GAC vessels been considered? Our consultants (CH2M Hill) point out that pressure units offer several cost and operational advantages over gravity-fed units: i) they allow the GAC to be more quickly and easily loaded and unloaded; ii) they would not allow VOCs to escape to the atmosphere; and iii) they allow longer run times before backwashing, minimizing "restratification" and early breakthrough of the GAC bed.
Figure 5.1	The Flow Diagram and description indicate that the Influent Flow Control Tank, GAC/FB Bioreactor, Media Separator, Media Filters, Equalization tank, and GAC Adsorbers are not covered and vent to atmosphere. We anticipate that vapors from these units and any other tanks (whether quiescent or aerated) upstream of the final VOC removal process may need to be captured and routed to a VGAC adsorber as planned for the Post-Aeration Tank

p5-3, §5.2.3 ¶ 1	The report describes the breakdown of most organic compounds to CO_2, H_20, and/or Cl^-. Is the breakdown always complete, or are some partially oxidized byproducts likely to reach the GAC adsorber?
p5-3, §5.2.3 ¶ 2	The report states that nitrate interferes with the UV/Oxidation process and uses this rationale, in part, to specify placement UV/Oxidation process at the "end-of-the-train." Please explain the basis for the statement that nitrate interferes with UV/Oxidation. UV/Oxidation processes are often used as pretreatment of refractory organics (e.g., VOCs) prior to biological treatment.
p6-1, §6.2	Is the Influent Flow Control Tank needed? Or could flow be maintained by instead using an inline flowmeter to directly regulate the variable frequency pumps?
p6-2, §6.3, Last ¶	What steps have been taken to locate ethanol with lower concentrations of impurities (e.g., ketones, other alcohols) than in Phase 1?
p6-2, §6.3, Last ¶	Page 3-4 indicates that the optimum ethanol dosage in Phase 1 was 40 mg/l, yet the Phase 2 system will be sized to provide a maximum dosage of 30 mg/l. We assume that the actual ethanol dose is expected to be substantially less than 30 mg/l due to the lower nitrate concentrations at the La Puente well. Please clarify the basis for the assumed 30 mg/l maximum.
p6-3 ¶ 2	Is the maximum sludge yield (and the size of the sludge handling equipment) adequately estimated? The report bases the size of the sludge handling process on a sludge yield estimate of 28.8 lbs VSS/day. Using an alternative estimation method (EPA's Nitrogen Control Manual (EPA /625/R-93/010) Table 4-1), we calculate a sludge yield estimate of 68 lbs VSS/day - more than twice the estimate provided in the report. The latter estimate assumes an ethanol dosages of 30 mg/l (about 63 mg/l COD), which results in an estimated sludge yield of 0.18 mg VSS/mg COD, and 11.3 mg/l of VSS.
p6-4, ¶ 2	The report specifies a static mixer for mixing the polymer prior to the media filters. Ken Martins at CH2M Hill notes that this approach could work, but that a two tank system providing rapid/flash mix and flocculation would provide much more flexibility in manipulating the biomass floc ahead of filtration and obtaining good filtration performance (TSS and pathogen removal). The two tank system would require a small residence time tank (approximately 1 to 3 minutes) and high energy mixer (2 hp/ 1,000 gal) for rapid/flash mix, and a larger tank (providing 20 to 40 minutes residence time) and low energy mixing (30 to 70 fps/ft) to promote gentle flocculation. Ken also recommends variable speed mixers in both tanks to provide flexibility during the operating phase of the test.

Table 6-1, 3rd page	Based on the information provided on Page 3 of Table 6.1, each of the two planned multi-media filter appears to be designed for 250 gpm (4gpm/ft2 x 62.5 ft2). During each of the daily backwash cycles one of the filters will need to be off-line. With both filters needed to handle the 500 gpm design flow rate, how will the downtime be handled?
p6-6 §6.8	The report states that ferric chloride, ferric sulfate, and aluminum sulfate will be evaluated as coagulants. Ken Martins notes that he has found that ferric and alum sludges yield gelatinous weak floc and are difficult to dewater. He suggests evaluating a high molecular weight (1 million plus) cationic emulsion polymer, such as Cytech (American Cyanamid) Magnafloc 1563C.
p6-6 §6.8	The report indicates that the dewatered sludge will attain about 40 percent solids by weight. Ken Martins notes that the percent solids is more likely to be 20 to 30 percent (particularly if ferric or alum is used), proportionally increasing the amount of sludge requiring disposal.
p6-7 §6.8	Is the estimated clarifier sludge production of 4,392 gal/day correct? Based on the report's estimated clarifier solids production of 44 lbs dry solids/day, and a clarifier sludge solids content of 2%, the weight of wet sludge would be about 2,200 lbs/day. If divided by the density (about 8.5 lbs/gal), sludge production would be about 260 gal per day.
p7-1 §7.0	The text mentions *some of* the key permitting requirements. What other permits are needed beyond those listed?
p7-1, § 7.2 (schedule)	The text states that the process for obtaining or amending a Regional Board discharge permit "has been initiated." Please briefly describe the permitting process and provide a schedule with line items for each significant step in the process.
p7-1, § 7.3 (schedule)	The text states that a permit application has been submitted to ATF. Please briefly describe the permitting process and provide a schedule with line items for each significant step in the process.
p7-1, § 7.4 (schedule)	Please identify the chemicals requiring certification, and the "chemical sourcing and certification procedures" that have been initiated. Please briefly describe the certification process and provide a schedule with line items for each significant step in the process.
(schedule)	Please provide a schedule with line items for submittal of a SAP/QAPP and O&M Manual. Please incorporate a two week period for DHS/EPA review.
(schedule)	Please provide a schedule with line items for each submittal to DHS or approval required by DHS for use of the treatment plan effluent as a drinking water source.

(schedule)	Please submit a schedule with provisions for weekly to biweekly interim reporting to EPA after startup. Reporting can be by mail, fax, telephone or email. Please include provisions for less frequent interim written reporting.
(schedule)	Please submit a schedule with line items for submittal of design documents, EPA review of the design, and the procurement, construction, and start up periods. Please briefly describe the procurement strategy.
Table 8-1	Please comment on the capability of ion selective electrodes to measure perchlorate and nitrate in water (e.g., Are they capable of reliably measuring perchlorate concentrations in water, but only at high concentrations?).
	Does the project team include individuals with expertise in microbiology, bacteriology, and related disciplines?